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Usefulness of medication instruction sheets for sharing information on cancer chemotherapy within the health care team

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Patients receiving cancer chemotherapy may experience a number of potentially severe adverse drug reactions. It is crucial for all members of the health care team to monitor the effect of medicines on the patient to ensure the safety and efficacy of the chemotherapy. The present study prepared medication instruction sheets (MISs) on hematological malignancy and conducted a questionnaire survey to verify their usefulness among physicians, dentists, and nurses. MISs were prepared for 103 chemotherapy and 44 pretreatment regimens for hematopoietic stem cell transplantation in the Department of Hematology at Kyushu University Hospital. Eight questions were prepared to investigate whether MISs could help physicians, dentists, and nurses manage cancer chemotherapy more safely, effectively, and efficiently, as well as in the sharing of information. A total of 35 medical staff working in inpatient wards, including 8 physicians, 3 dentists, and 24 nurses, participated in the questionnaire survey. All of the staff responded to the questionnaire survey, which showed that the MISs were favorably accepted by the participants. There was no negative opinion on the management of chemotherapy using the MISs. The MIS was a useful tool for sharing information on cancer chemotherapy between patients and medical staff and for enabling efficient management, thereby improving the safety and efficacy of treatment.

1. Introduction

Patients receiving cancer chemotherapy may experience a number of potentially severe adverse drug reactions (ADRs). It is critical for all members of the health care team, including the pharmacist, physician, dentist, and nurse, to monitor the effect of medicines on the patient adequately to ensure the safety and efficacy of the chemotherapy. Cancer patients often feel depressed and have anxiety regarding the treatment. Especially, older adults may not fully understand the explanation of their treatment. Meanwhile, pharmacists must check a wide range of prescriptions based on chemotherapy dosage schedule and intervene on the type, extent, and timing of ADRs pharmacologically to provide effective and safe medication treatment and reduce patient anxiety (Aziz et al. 2017; Bosnak et al. 2018; Fornasier et al. 2018; Holle et al. 2017; Ikesue et al. 2004; Patel and Gurumurthy 2019) .

Medical staff must understand and share treatment information and relevant data, such as dosage, administration route, schedule, and restrictions to use, regardless of their experiences. A large number of cancer treatment regimens have so far been standardized for various types and grades of cancer, and assessment tools can be used to raise awareness of patient complaints and symptoms promptly and ensure patient compliance using the prescribed therapy. More than 100 regimens exist for the treatment of hematological malignancies; severe ADRs are induced at relatively high frequency. For example, hematopoietic stem cell transplantation requires the management of complicated pretreatment, and sharing information within the health care team is of significant importance to ensure safety, efficacy, and efficiency.

In the present study, medication instruction sheets (MISs) concerning hematological malignancy were prepared, and a questionnaire survey to examine their usefulness was conducted for physicians, dentists, and nurses.

2. Investigations and results

2.1. Respondents' characteristics

All of 35 medical staffs responded to the questionnaire, and the response rate was 100 %. Details of on their job categories and years of service are summarized in Table 1. A majority (68.6 %) of the respondents were nurses, more than half of whom had less than five years of service. Among the participating physicians and dentists, 62.5 % and 100.0 % of them, respectively, had more than 10 years of experience.

2.2. Rating scale questionnaires

Figure 2 shows the results for a set of eight questions using the semantic differential scale. The frequency distribution indicates the percentage of participants who chose each response option; no participant chose either "definitely no" or "no" for any question, indicating the MIS was favorably and positively received by the participants in all items. Moreover, 100% of the participants answered either "definitely yes" or "yes" for "ease of checking" with respect to not only the treatment schedule but also the main adverse effects and frequent times of onset. Similarly, all of the participants favorably accepted the achievement of risk avoidance, promotion of team medicine, and general use of MISs (Table 2). A number of nurses could not clearly decide whether patients' understanding of cancer chemotherapy improved and whether the information was shared among medical staff. It was also unclear whether the MISs were useful for the education of new employees.

3. Discussion

Patients have to give written informed consent when starting cancer chemotherapy. Thus, they need to receive from a physician

Table 1: Respondents' characteristics

Years of service	Job category					
	Physician		Dentist		Nurse	
	N	(%)	N	(%)	N	(%)
<1	0	(0.0)	0	(0.0)	1	(4.2)
1–3	0	(0.0)	0	(0.0)	9	(37.5)
3–5	2	(25.0)	0	(0.0)	7	(29.2)
5–10	1	(12.5)	0	(0.0)	5	(20.3)
10<	5	(62.5)	3	(100.0)	2	(8.3)
Total	8	(100.0)	3	(100.0)	24	(100.0)

sufficient information on the condition of the disease, treatment options, expected and unexpected effects and risks, and other relevant data. Nurses and other staff also explain various details. To patients, much information on chemotherapy is often disturbing; especially, older adults at times cannot fully understand the explanation. Pharmacists thus need to relieve the anxiety of patients and their families through medication guidance; they should encourage the patient to participate in the treatment actively. To help patients understand their medical treatment, it is useful to use medication guides and written information, in which wording and expressions are as plain as possible. In our previous study (Ikesue et al. 2004), a MIS for paclitaxel-carboplatin regimen was prepared and provided to ovarian cancer patients; the results showed that the MIS is highly useful as a communication tool between patients and pharmacists. In the present study, the design of the MIS was improved to provide a brief explanation and/or illustration of each item, so that patients could better and more easily understand the complicated medical treatment for hematological malignancy.

As shown in Fig. 2, no medical staff made a negative comment on the MIS. In the present clinical setting, the MIS was set at the patients' bedside, and the patients could fill their subjective symptoms for any day during the treatment. The MIS could help medical staff manage and confirm the treatment schedule, as well as describe objective symptoms and laboratory data. A series of these actions was repeated daily, and medical staff could update and share the information on the patients' condition.

Severe ADRs are induced at relatively high frequency in the treatment of hematological malignancies. Hematopoietic stem cell transplantation requires the management of complicated pretreatment, and therefore, sharing information within the health care team is of high importance. Meanwhile, a lack of knowledge on pediatric hematology

Table 2: Frequency distribution of medical staff in rating scale questionnaires

	Definitely yes (%)	Yes (%)	No option (%)	No (%)	Definitely no (%)
1) Is it easy to check the treatment schedule?					
Physician	87.5	12.5	0	0	0
Dentist	100	0	0	0	0
Nurse	83.3	16.7	0	0	0
2) Is it easy to check the main adverse effects and their frequent times of onset?					
Physician	50.0	50.0	0	0	0
Dentist	66.7	33.3	0	0	0
Nurse	62.5	37.5	0	0	0
3) Has the patients' understanding of cancer chemotherapy improved?					
Physician	62.5	37.5	0	0	0
Dentist	33.7	66.7	0	0	0
Nurse	83.3	12.5	4.2	0	0
4) Is Information shared among patients, doctors, nurses, and pharmacists?					
Physician	75.0	25.0	0	0	0
Dentist	66.7	33.3	0	0	0
Nurse	66.7	25.0	8.3	0	0
5) Is the education of new employees (residents and new nurses) facilitated?					
Physician	62.5	25.0	12.5	0	0
Dentist	33.3	66.7	0	0	0
Nurse	91.7	4.2	4.2	0	0
6) Is risk avoidance achieved?					
Physician	75.0	25.0	0	0	0
Dentist	66.7	33.3	0	0	0
Nurse	66.7	33.3	0	0	0
7) Is team medicine promoted?					
Physician	75.0	25.0	0	0	0
Dentist	100	0	0	0	0
Nurse	83.3	16.7	0	0	0
8) Is the medication instruction sheet (MIS) generally useful?					
Physician	100	0	0	0	0
Dentist	100	0	0	0	0
Nurse	91.7	8.3	0	0	0

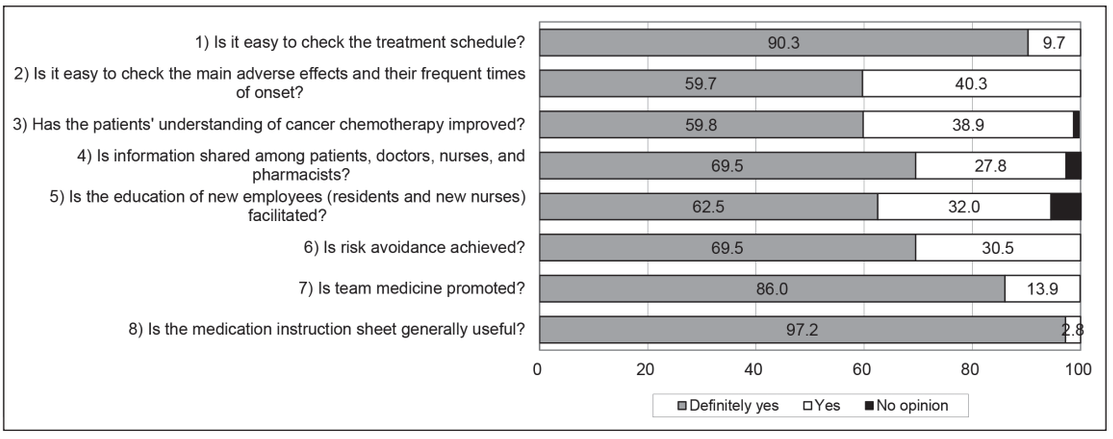

Fig. 1: Rating scale questionnaire results. The particpants were 35 medical staff in inpatient wards, including 8 physicians, 3 dentists, and 24 nurses. They were required to answer a question on the use of MIS using a five-point semantic differential scale: "Definitely yes" (gray), "Yes" (white), "No option" (black), "No," and "Definitely no." The frequency distribution indicates the percentage of respondents who chose each response option. No respondent chose either "Definitely no" or "No" for any of the questions.

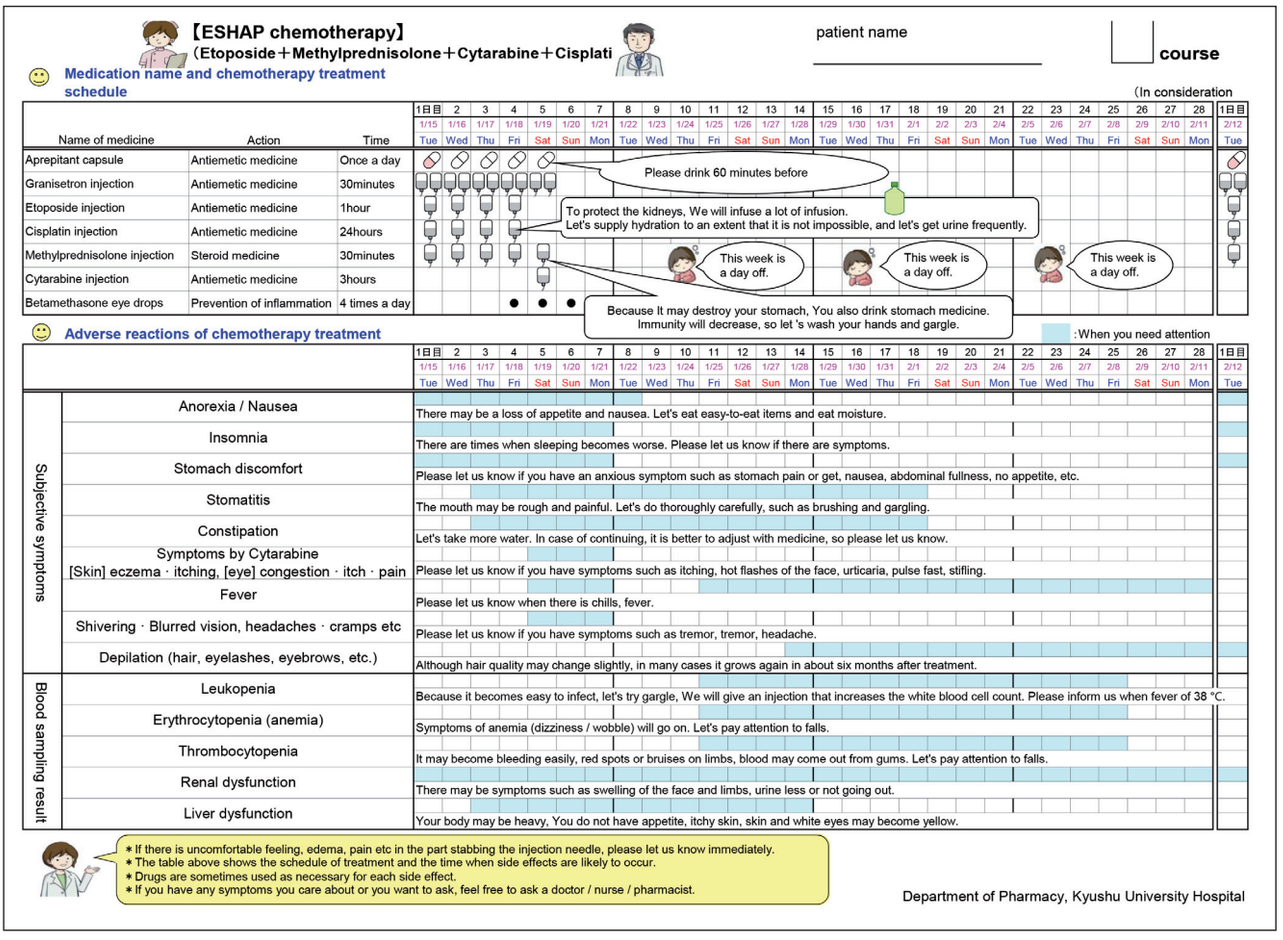

Fig. 2: Example of a medication instruction sheet (MIS). A typical MIS was prepared for ESHAP (etoposide + methylprednisolone + cytarabine + cisplatin) therapy for non-Hodgkin's lymphoma. The upper part shows the names of the chemicals and treatment schedule, whereas the lower one shows the frequent times of onset of adverse drug reactions. A brief explanation is given for each item. The MIS was arranged to fit a four-week cycle schedule in one sheet according to the treatment regimen, and was posted at the patients' bedside.

and hematopoietic stem cell transplantation has been reported in pharmacists and medicine students (Bauters et al. 2017). Thus far, more than 100 chemotherapy regimens have been standardized in hematological malignancy treatment, and it is necessary to construct a continuous learning and education system to follow these regimens. Herein, the MIS may be helpful for new pharmacists and medicine students to learning these new regimens, as much of the information on dosage schedule and possible ADRs are compactly collected into one sheet. Meanwhile, the results of a questionnaire survey concerning the education of new employees showed that the MIS was not always a useful tool to facilitate education (Fig. 1, Table 2). A reason probably was that participants included staff who lacked sufficient experience in chemotherapy treatments or did not have the position to give advice and educate inexperienced ones (Table 1).

During cancer treatment, medical staff members need to check the chemotherapy orders according to their professional ability. If a medication error occurs, it is necessary to analyze the cause by type and to utilize the analysis results for subsequent cases (Zhu et al. 2016). In a recent review concerning chemotherapy medication errors in oncology, medication errors can occur at all stages of medication use (Weingart et al. 2018). Some interventions, such as the use of proactive risk assessment, drug administration protocols, guidelines and checklists, and patient and provider education, are likely to have the potential to improve chemotherapy safety. In the departments of hematology and oncology, clinical pharmacists involved in pharmaceutical intervention identify drug-related problems in 12.6 % of prescriptions for cancer patients (Delpeuch et al. 2015). Our present MIS can be easily individualized for each patient, medical staff, and health care team, and would be useful in these circumstances.

The MIS is a useful tool for sharing information on, and the efficient management of, cancer chemotherapy between patients and medical staff. Thus, it helps to improve the safety and efficacy of chemotherapy.

4. Experimental

4.1. Medication instruction sheet (MIS)

MISs, which contain one part on the treatment schedule and another on ADRs during treatment, were prepared for 103 chemotherapy and 44 pretreatment regimens for hematopoietic stem cell transplantation, posted on the bedside of patients in the Department of Hematology, Kyushu University Hospital. The ADRs with predicted frequency of > 10 % were adopted as the items, and serious ADRs were also listed regardless of their frequency. Each item in the MIS was given an explanation, sometimes by speech bubbles, and color-coded to make it easy for patients to understand visually (Makieda et al. 2010; Oishi et al. 2012). A typical MIS for non-Hodgkin's lymphoma is shown in Fig. 2.

4.2. Assessment of MISs

A total of 35 medical staff members working on inpatient wards, including 8 physicians, 3 dentists, and 24 nurses, participated in the questionnaire survey. They were required to answer a question on the use of MIS using a five-point semantic differential scale: "definitely yes," "yes," "no option," "no," and "definitely no." The participants were also asked to enter cases in which the MIS was useful, as well as other opinions and suggestions.

4.3. Ethics approval and consent to participate

This study was conducted with the approval of Osaka University of Pharmaceutical Sciences (approval no. 0059 of the institutional review board), and with the approval of Kyushu University Graduate School and Faculty of Medicine (approval no. 30-529 of the institutional review board).

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Authors' contributions: MU originally designed the concept and performed data aggregation and manuscript writing. TN performed data aggregation and manuscript writing. HW got through the Ethics Review Board. HW, KK, TM, KA, and SM provided the interpretation and discussion of the data. All authors have read and approved the final manuscript.

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